

Installation Instructions

379H

Size 450
180R & 240R
Series D

OUTDOOR HEATING AND COOLING UNIT

bryant

39379D35
1/3/72

The Bryant Model 450-379H is a heating unit designed for outdoor installation; either rooftop or at ground level. It is available with either of two factory-installed direct expansion coils (Model 180R- or 240R-379) or with no expansion coil as Model 450-379H. Model 180R units are equipped for use with R22 refrigerant and provide 180,000-Btuh cooling when connected with a Bryant Model 180-566 Condensing Unit. Model 240R units are equipped for use with R500 refrigerant and provide 240,000-Btuh cooling when connected with a Bryant Model 240-566 Condensing Unit. All three models have a heating input of 450,000 Btuh (approximately) for both natural and propane gas. They are equipped with a two-stage firing arrangement for operation at a reduced input of 225,000 Btuh.

Important-Read Before Installing

Be sure the available gas supply is the same as that shown on the American Gas Association (A.G.A.) rating plate. Check the electrical supply to be sure that voltage, frequency, and phase correspond to that specified on the unit rating plate.

Check all national, state, and local building codes affecting the installation of this unit. Check all local ordinances that could affect the installation of this type equipment.

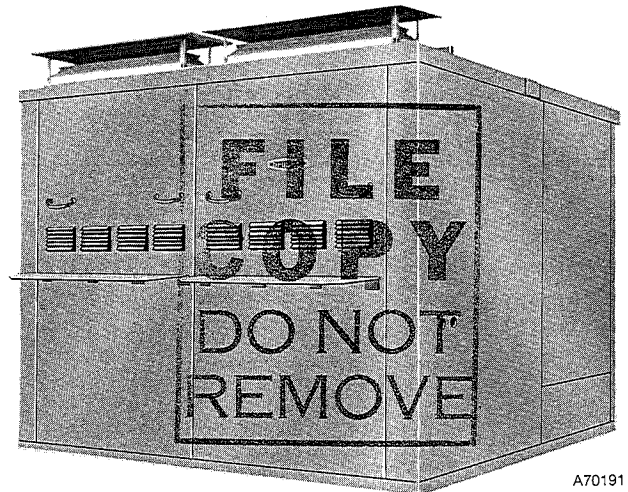
WARNING: All access panels must be in place at all times when unit is in operation.

GENERAL

The design of the unit is certified by the American Gas Association (A.G.A.) for use with natural or propane gas with the appropriate controls and orifices. The units are designed specifically for outdoor installation, either at rooftop or ground level.

Installation of the unit consists of the following:

- I. Locating the Unit
- II. Gas Piping
- III. Duct Connection
- IV. Venting
- V. Coil Connection (Models 180R- and 240R-379H)
- VI. Electrical Connections
- VII. Start-up and Adjustments
- VIII. Maintenance



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Figure 1

SECTION I. LOCATING THE UNIT

Extreme caution should be observed to prevent damage when moving the unit. Maintain the unit in an upright position at all times during rigging and moving operations. To facilitate lifting and moving operations, place the unit in an adequate rope or cable sling.

CAUTION: Protect the top and sides of the unit from possible damage from rigging sling.

Rooftop Installation

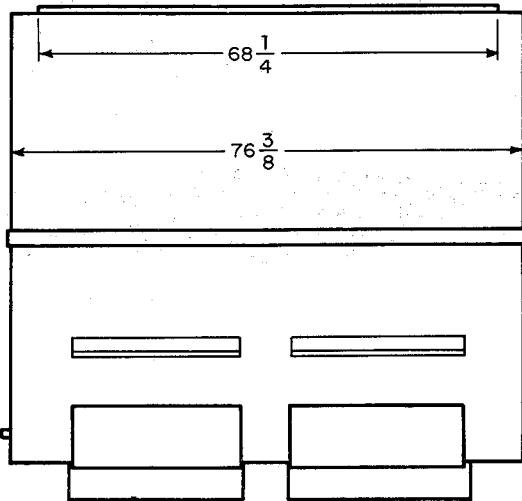
Level the unit on a base situated a minimum of 6 inches above the roof to insure proper drainage. Consult local and state building codes for installation requirements. Be assured the roof construction will support the weight of the equipment.

Ground Level Installation

The unit should be placed on a level concrete slab (4-inch minimum thickness); level the unit on the slab with 1-inch clearance to insure proper drainage.

Combustible Clearances

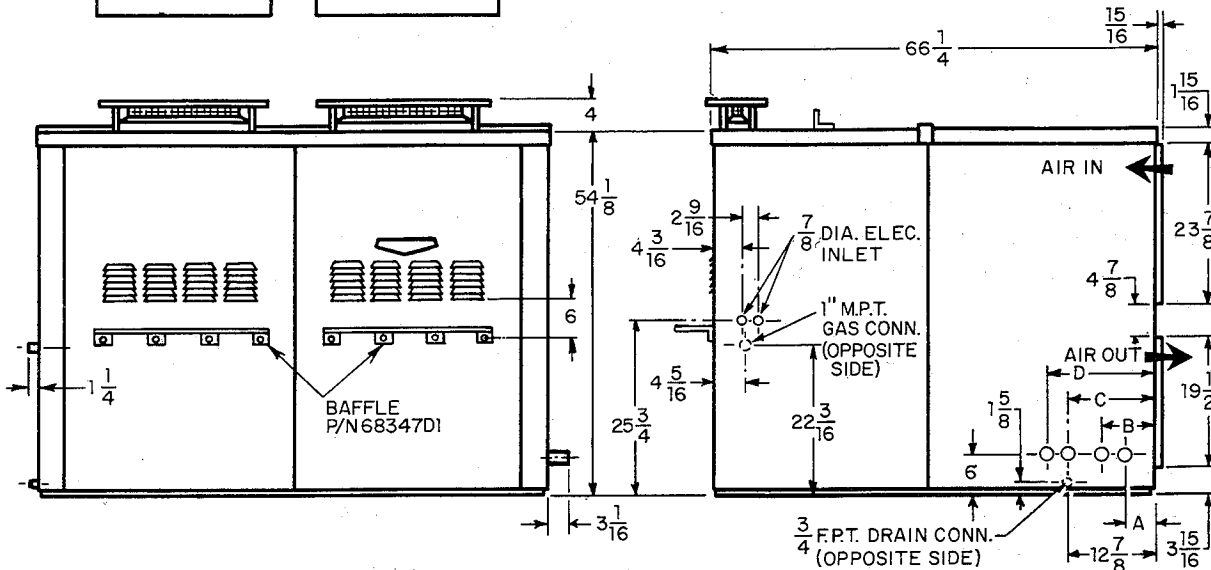
Minimum clearances are: 6 inches from rear or duct side, 24 inches on all other sides, and 0 inch on the bottom. These clearances permit the use of combustible materials for supports. The top of the unit must be kept clear at all times.



UNIT SIZE	CONNECTION SIZE (COIL)		A	B	C	D
180R-379H	7/8 OD (Suction)*	2 ea	6-3/16		14-13/16	
	5/8 OD (Liquid)*	2 ea		10-3/16		18-13/16
240R-379H	1-3/8 OD (Suction)	2 ea	7-3/16		12-5/8	
	5/8 OD (Liquid)	2 ea		10-3/16		18-1/2

*Refer to condensing unit for compressor suction and liquid line sizes

Approximate Shipping Weights
 450-379H—1425 lbs
 180R-379H—1460 lbs
 240R-379H—1565 lbs



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Figure 2-Dimensional Drawing

TABLE I- Ratings and Capacities

. Model 450-, 180R-, & 240R-379H		
Heating Input, 1st Stage	Btuh	225,000
Heating Output, 1st Stage	Btuh	168,000
Heating Input, 1st & 2nd Stages	Btuh	450,000
Heating Output, 1st & 2nd Stages	Btuh	337,000
Approved Temp Rise	°F	20-75
CFM 0.5 inch wc S.P.		6,000
Blower Motor	HP	3
Power Supply		208-60-3 230-60-3
Full Load Current	Amps	8.4 8.4
Locked Rotor Current	Amps	58.2 53.0
Speed	RPM	3450
Frame Size		56
Branch Circuit Wire Size Min*	AWG No.	14 14
Branch Circuit Fuse Size Max	Amps	25 25
Filters	Size	(450-379H) (6) 16x25x1 (180R & 240R) (3) 16x25x1 (3) 20x25x1

*If aluminum conductors are to be used, the connections must be made in accordance with the National Electric Code. The wire size selected must have a current capacity not less than that of the copper wire specified and must not create a voltage drop between the service panel and the unit in excess of 2% of the unit rated voltage.

SECTION II. GAS PIPING

A separate gas supply line should be installed to run directly from the meter to the heating section. Check your local utility for recommendations concerning existing lines. Choose a supply pipe large enough to keep the pressure loss as low as practical. *Never use pipe smaller than the gas connection to the heating section.* Observe local codes for all gas pipe installations.

The following are pertinent recommendations:

1. Avoid low spots in long runs of pipe. It is best to grade all pipe 1/4 inch in every 15 feet to prevent traps. All horizontal runs should grade downward to risers. Risers should be used to connect to heating section and to meter.
2. Install drip leg in riser leading to heating section. Drip leg will function as trap for dirt and condensate. Drip legs should be installed where condensate will not freeze.
3. Install manual shutoff valve in gas supply pipe near heating section, where it can be easily reached.
4. Install ground joint union close to furnace between gas controls manifold and manual shutoff valve.
5. Support all piping with appropriate hangers, etc. Use a minimum of one hanger every 10 feet.
6. Use joint compound (pipe dope) that is resistant to action of propane gas.
7. After all connections are made, use soap-and-water solution to check for leaks (or method specified by local utility regulations).

WARNING: Never use a match or other open flame.

SECTION III. DUCT CONNECTIONS

Before ductwork can be attached to the unit, remove the panels located over the outlet and the return air opening. The ductwork may be screwed or bolted to the unit flange with suitable gaskets to insure a weathertight seal. Be sure that the sheet metal overlaps the flange on the unit.

NOTE: When using Bryant plenum package, the upper skirt of the plenum should be placed up and under top cover of the unit, then sealed properly. All ductwork external of the structure must be properly insulated and waterproofed. All openings in the structure must be properly flashed in accordance with local codes and good building practices. The supply and return ductwork should be provided with an approved vibration eliminator.

NOTE: The vibration eliminator must be located within the structure.

SECTION IV. VENTING

The vent cap assemblies, including three sheet metal angles, are packaged in the gas control compartment. Installation of these assemblies is as follows:

1. Remove the discard cover on each of vents on roof of unit.
2. Remove top plate from each vent cap assembly by removing four retaining screws.
3. Use screws supplied with assemblies to fasten base section of vent cap assembly to vent-section top cover plate: unit top is drilled to receive these screws.
4. Reattach top cover plate removed in Step 2 above.
5. Remove three self-tapping retaining screws (located approximately 7 inches behind each vent cap) from unit cover. Fasten sheet metal angle from each vent cap (use retaining screws previously removed).

SECTION V. COIL CONNECTION (180R- & 240R-379)

1. Refer to condenser installation sheet for coil connections of R Models. **NOTE:** Coil connections are sealed and seals should not be broken until just immediately before making connections to condenser unit.

SECTION VI. ELECTRICAL CONNECTIONS

IMPORTANT: Before proceeding with the electrical connections, check the power supply to be sure that the voltage, frequency, and phase correspond to that specified on the unit rating plate.

All electrical connections must be made in accordance with the National Electrical Code and local codes governing such wiring. The field connections must be made in accordance with the wiring diagrams included in this instruction (see Figures 3 and 4). A separate electrical line should be run for this installation and it should contain a fused disconnect switch placed in a convenient location. For maximum fuse and minimum wire sizes, refer to Ratings and Capacities Table. Field wiring connections are made in the control box located in the gas control compartment of the unit. Wiring entrances are made to the control box through knock-outs provided in the casing. All wiring entrances to the unit must be weatherproof and watertight. The thermostat heating anticipator should be set at 0.8 amperes for the first stage and 0.4 amperes for the second stage. Use thermostat assembly Bryant Part No. 34427D57 (782F) and sub-base assembly Bryant Part No. 34427D59 (Q672B).

NOTE: Both thermostat and sub-base assemblies are for heating only. For field wiring diagram, refer to Figure 3.

NOTE: If aluminum conductors are used, the connections must be made in accordance with the National Electric Code. Aluminum wire connections *must* be made with special connectors. In preparing the wire just before installing the connector, all aluminum wire must be "brush-scratched" and the wire coated with a corrosion inhibitor, such as "Pentrox A." When it is suspected that the connection will be exposed to moisture, it is very important to cover the entire connection completely to prevent an electro-chemical action that will cause the connection to fail very quickly. Reducing the effective size of the wire, such as cutting off strands so that the wire will fit a connector, is very poor practice. Proper size connectors should be used.

SECTION VII. START-UP AND ADJUSTMENTS

Before starting the unit, make sure that the gas pipe is purged and free from air. Do not purge into the combustion chambers. All gas piping connections should be leak-tested.

WARNING: Do not use an open flame to leak-test. Use a soap-and-water solution.

Start-Up

COOLING

Refer to appropriate Bryant Model 566 installation instructions for cooling section starting procedure.

HEATING

Follow the lighting instructions attached to the unit. The sequence of control operation is as follows:

1. Turn on electrical power and gas supply to unit.
2. When pilot gas cock is opened, gas flows to pilot and to pilot pressure switch. Pilot pressure switch then closes to complete 24-Volt circuit. Pilot then lights automatically. The circuit is then completed through switching of first pilot to second-pilot igniter coil automatically lighting second pilot. After the pilots have been automatically lighted, electrical potential is available to first stage gas valve. When thermostat calls for heating, a circuit is completed between W1 and 4. This allows current to flow through first-stage gas valve and fan switch. If room temperature continues to drop, second stage of thermostat will complete a circuit between 4 and W2, energizing second-stage gas valve, bringing unit to full power. On setting room thermostat below room temperature, both stages of firing will shut off.

Safety Pilot Test

1. If any one pilot should be extinguished, switch action of pilot will interrupt electrical circuit of first-stage gas valve consequently, unit will shut off.

2. To check this operation, turn pilot gas valve off manually. The pilots should re-ignite automatically when pilot gas valve is turned on.

NOTE: There will be a time interval or delay before the pilot coils will ignite the pilot again.

Limit Control

1. Bryant Model 379 is equipped with lower and upper limit controls.

2. If lower limit opens, first stage of automatic gas valve is de-energized, shutting off gas.

3. If upper limit opens, first stage of the automatic gas valve is de-energized, and the SPDT switching action of upper limit bypasses gas valves circuit and energizes fan delay relay and blower motor starts.

4. Upper limit control has a dual function: its primary action is to shut off the gas valve, but it also energizes the blower motor if the furnace becomes overheated. The recommended method of checking the limit controls is to gradually block off the return air after the furnace has been operating for a period of at least 5 minutes. As soon as the limit is proved safe, the return air opening should be unblocked to permit normal air circulation. By using this method to check the limit, it can be established that (providing the limit is functioning properly) it will fail-safe if there is motor failure or overheating of the heating section of the unit.

Fan Relay

The unit utilizes a fan delay relay located in the control box. Upward movement of the adjustment lever causes a lengthening in the "off" cycle, this results automatically in shortening the "on" cycle. Downward movement of the adjustment lever has the opposite effect, the "off" cycle is shortened, the "on" cycle is lengthened.

Adjusting Gas Input (Natural Gas Unit)

The gas input should agree with that shown on the unit rating plate (450,000 Btuh). The burners are equipped with fixed orifices. The burners on the natural gas units are equipped with No. 38 drill size orifices.

The following method may be used to adjust the input on natural gas units.

Water Manometer

When using a water manometer to measure the manifold pressure, proceed as follows to adjust the gas input:

1. Turn off gas to unit. Connect manometer to 1/8-inch pressure tap at outlet of gas valve.
2. Turn on gas to unit. With burners fired and both first and second stage gas valves open, adjust the pressure regulator to obtain the correct manifold pressure as shown in Table II. Check with local gas utility for Btu value and specific gravity of gas in the area.

TABLE II

BTU Value	Specific Gravity				
	0.59	0.61	0.63	0.65	0.67
900	3.8	3.9	4.0	4.1	4.2
950	3.3	3.4	3.5	3.6	3.7
1000	3.0	3.1	3.2	3.3	3.4
1025	2.8	2.9	3.0	3.1	3.2
1050	2.7	2.8	2.9	3.0	3.1
1100	2.4	2.5	2.6	2.7	2.8

Example: Heating value of gas in the area is 1030 Btu; Specific gravity is 0.62.

- (a) From Table II the manifold pressure required for 450,000 Btuh is 3.0 inches wc.
- (b) Set manifold pressure to 3.0 inches water column by adjusting gas pressure regulating screw.

If the required manifold pressure exceeds 3.3 inches w.c. or is less than 2.7 inches w.c., the orifices should be sized according to unit requirements.

CAUTION: Do not redrill orifices under any circumstances.

Air Shutter Adjustment

To adjust the primary air to each burner, partially close the air shutter until there is a slight yellow tip on the top of the flame, then open the air shutter until the yellow tip just disappears. This should be done after the burners have been operating at full input for 5 or 10 minutes (approximately).

Temperature Rise

Models 450-379H, 180R-, and 240R-379 are designed for operation within a temperature rise range of 20°F to 75°F against an external static pressure up to 1.0 inch water column.

NOTE: Temperature rise is the difference between the temperature of the air in the return air duct and the temperature of the air in the discharge duct near the heating section.

SECTION VIII. MAINTENANCE

Lubrication: Refer to the rating plate for the blower motor lubrication requirements.

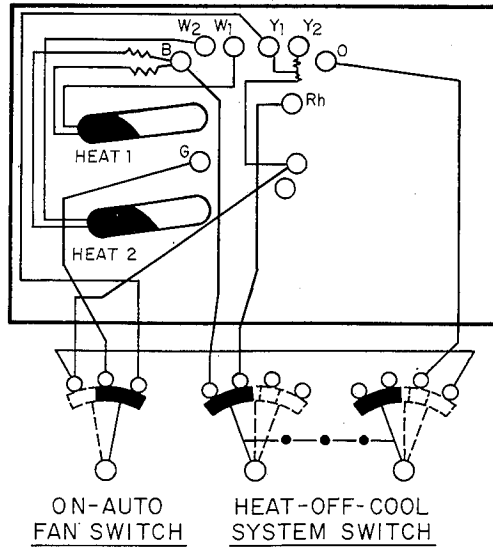
Cleaning the Heating Unit

1. Be sure that main line disconnect switch is in OFF position.
TAG SWITCH WITH SUITABLE WARNING LABEL.
2. Remove front access panel.
3. Turn off manual gas valve and pilot valve.
4. Disconnect pilot and escapement tubing.
5. Remove burners.
6. Remove flue baffle retainer and the flue baffles.
7. Clean flue passages with suitable brush.
8. Reassemble furnace by reversing above procedure, making sure all seals are reinstalled properly.
9. Check belt conditions and for proper belt tension (1/2 inch deflection).

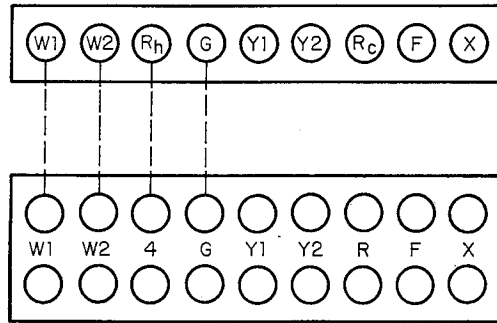
Filter

Filters in Models 240R- and 450-379H are of the permanent type and should be inspected and cleaned at regular intervals. Filters used in Model 180R-379H are of the disposable type and should be inspected and replaced with filters of the same type and size. Inspections should be made on a regular basis; the time interval between inspection will depend on the type of application.

- FACTORY WIRING
- - - FIELD WIRING
- • - • - MECHANICAL CONNECTIONS



THERMOSTAT
34427D57(872F)



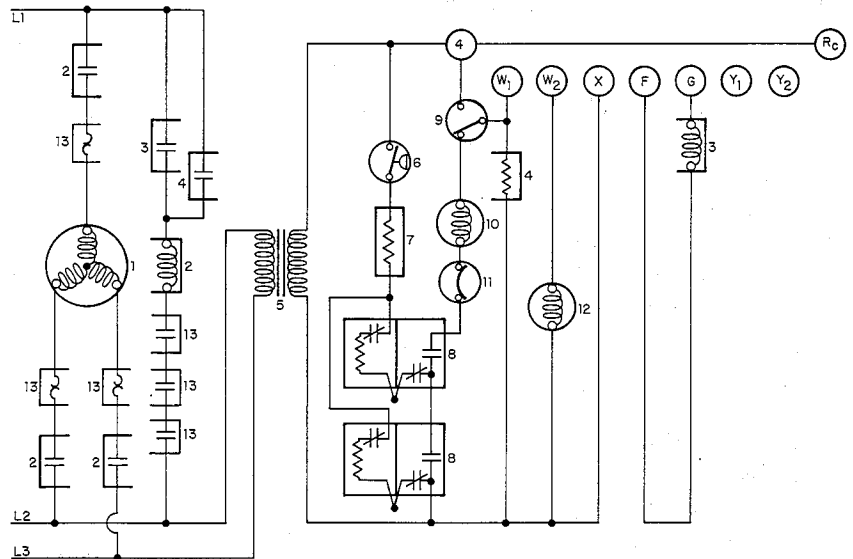
SUBBASE
34427D59(Q672B)

UNIT
LOW-VOLTAGE
TERMINAL STRIP

B71459

Figure 3-Field Wiring Low-Voltage, Models 450H-, 180R-, 240R-379

1. Blower Motor
2. Contactor
3. Cooling Fan Relay
4. Delay Heating Relay
5. Transformer
6. Gas Pressure Switch
7. Resistor
8. 733 Automatic Pilot
9. Limit Switch
10. 1st Stage Gas Valve
11. Secondary Limit Switch
12. 2nd Stage Gas Valve
13. Motor Overloads



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Figure 4-450-379H Series C, 208 or 230 Volt, 60 Hertz, 3 Phase